Communicable Disease Report

Hawai'i Department of Health
Communicable Disease Division
Disease Outbreak and Control Division

http://www.state.hi.us/doh/resource/comm_dis/cdr.html May/June 2003

Severe Acute Respiratory Syndrome Update

Editor's Note. SARS has rapidly come under control in each of the countries experiencing widespread outbreaks. Active surveillance is continuing to prevent further outbreaks. Because our understanding of its etiology and epidemiology is rapidly growing, the information presented below is current as of July 1, 2003.

Background

Severe Acute Respiratory Syndrome (SARS) is a recently discovered respiratory illness probably caused by a virus. It is characterized by a rapid onset following an incubation period of 2-10 days, with a fever greater than 38°C (100.4 degrees F) and cough, shortness of breath, or difficulty breathing.

On February 11, the Chinese Ministry of Health notified the World Health Organization (WHO) that 305 cases of acute respiratory syndrome of unknown etiology had occurred in Guangdong (formerly Canton) province during November 16, 2002 – February 9, 2003. Subsequently cases with similar clinical presentations were reported from Hong Kong; Hanoi, Vietnam; Singapore; Taiwan and Canada. Of the 8445 probable cases reported by the WHO as of July 1, 2003, 812 (9.6%) have died. In addition, secondary attack rates of >50% have been observed among health-care workers caring for patients with SARS and close contacts of suspected cases in mainland China, Hong Kong, Singapore, Hanoi, Vietnam and Toronto, Canada. On the basis of more detailed and complete data and more reliable methods, the WHO now estimates that the case fatality ratio of SARS ranges from 0-50% depending on the age group affected, with an overall estimate of case fatality rate of 14-15%.

Table 1. Severe Clinical Features in Hong Kong
N=75

Sign/symptom	% Patients	Median days after onset (Range)
Recurrent Fever	85.3	8.9 (4-18)
Watery diarrhea	73.3	7.5 (3-15)
Radiological deterioration	80.0	7.4 (3-13)
Respiratory deterioration*	45.3	8.6 (5-19)

* Marked improvement of initial pulmonary lesions was closely associated with appearance of new radiological lesions at other sites. 20% progressed to acute respiratory distress syndrome during the third week.

Clinical Disease Discoveries

According to a study of the Amoy Gardens, Hong Kong cases, three clinical phases were identifiable. The first week patients had fever, myalgia and assorted other symptoms. Improvement in symptoms occurred after a few days. The second week patients demonstrated a recurrence of fever, diarrhea and oxygen desaturation. Twenty percent of the patients continued into a third phase with acute respiratory distress syndrome, necessitating ventilatory support. Some recovered patients were noted to be shedding the virus in their stool and urine for up to seven days, while others showed evidence of pulmonary fibrosis as a result of the infection.

Table 1 reviews progression on severe symptoms seen in Hong Kong published in the Lancet[4] on May 24, 2003.

A review of 138 suspected cases of SARS in Hong Kong published in the New England Journal of Medicine[5] documented independent predictors of adverse outcomes (respiratory failure requiring care in an ICU or death) by multivariate analysis. They were advanced age, a high peak lactate dehydrogenase level, an absolute neutrophil count that exceeded the upper limit of the normal range on presentation.

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Countries Affected

From November 1, 2002 through June 26, 2003, probable and suspected cases of SARS have been reported by 29 countries including: Australia, Brazil, Canada, China (28 provinces plus Hong Kong and Macao), Colombia, Finland, France, Germany, India, Indonesia, Italy, Kuwait, Malaysia, Mongolia, New Zealand, Philippines, Republic of Ireland, Republic of Korea, Romania, Russian Federation, Singapore, South Africa, Spain, Sweden, Switzerland, Taiwan, Thailand, United Kingdom, United States, and Vietnam.

As of June 30, 2003 in the U.S., there were 419 cases including 73 (17%) probable cases (including seven laboratory-confirmed cases) with no deaths from 42 states including Hawai`i, and Puerto Rico. Only the U.S. probable cases are reported to WHO. The six suspected Hawai`i cases had mild respiratory illnesses and have been released from the hospital. Four had recent travel history to active SARS areas in Asia, while the other two attended one of the patients in the hospital. None of the local cases were confirmed.

Etiology

A novel, previously unknown coronavirus is suspected to be the cause of SARS. Recent experiments at the CDC have also shown the virus to be viable on plastic surfaces at room temperature for at least 48 hours. It survived for one day in urine at room temperature. It has also survived for four days in diarrheic stool. It has been found to be resistant to disinfectants like bleach, ethanol, phenol, formaldehyde and paraformaldehyde. It is susceptible to temperatures about 98.6°F, but has survived for four days at refrigerator temperatures and indefinitely below freezing. On May 2, 2003, Hong Kong scientists reported identifying four distinct strains of the virus, suggesting that it mutates rapidly. The ability to rapidly mutate may present problems with treatment and prevention through vaccination if that pattern continues.

The WHO has identified a closely related virus in civets, a badger and a raccoon dog in southern China. At this time, it is not known if they are the reservoirs of the virus, or have contracted it from people.

Transmission

From patterns of disease spread, transmission is thought to be primarily through droplet inhalation or close face-to-face contact with another case; i.e. healthcare workers attending cases and/or close family members. However, based on increasing incidence in Hong Kong in an apartment complex, it is also likely to be transmitted through environmental sources; e.g. leaky sewage pipes.

The WHO has documented in-flight transmission of SARS among airline passengers. There have been four flights during which transmission of SARS may have occurred, involving 27 cases. One flight accounted for 22 of the 27 cases. It is known that on one flight, persons sitting seven rows in front and five rows behind a person with symptomatic SARS developed the disease. Four flight attendants have also become infected.

Case Definition

The CDC revised the case definition for SARS on May 20, 2003. This definition should be used for reporting and classification purposes only. It should not be used for clinical management or as the only criterion for identifying or testing patients who might have SARS or for instituting infection-control precautions.

Clinical criteria

- Asymptomatic or mild respiratory illness
- Moderate respiratory illness
  - o Temperature >100.4°F (>38°C), and
  - o One or more clinical findings of respiratory illness (cough, shortness of breath, difficulty breathing, or hypoxia).
- Severe respiratory illness
  - o Temperature of >100.4°F (>38°C),[a] and
  - o One or more clinical findings of respiratory illness (see above)
  - o And
    - ◊ radiologic evidence of pneumonia, or
    - ◊ respiratory distress syndrome, or
    - ◊ autopsy findings consistent with pneumonia or respiratory distress syndrome without an identifiable cause.

Epidemiologic criteria

- Travel (including transit in an airport) within 10 days of onset of symptoms to an area with current or recently documented or suspected community transmission of SARS,[b] or
- Close contact[c] within 10 days of onset of symptoms with a person known or suspected to have SARS infection.

Laboratory Criteria[d]

- Confirmed
  - o Detection of antibody to SARS in specimens obtained during acute illness or >21 days after illness onset, or
  - o Detection of SARS RNA by RT-PCR confirmed by a second PCR assay, by using a second aliquot of specimen and a different set of PCR primers, or
  - o Isolation of SARS
- Negative
  - o Absence of antibody to SARS in convalescent serum obtained >21 days after symptom onset.

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Bioterrorism Preparedness and Response Branch	587-6845
Information & Disease Reporting	586-4586
After-hours Emergency Reporting	247-2191 (State Operator)
After-hours Neighbor Island Emergency Reporting	800-479-8092

The Health State
HAWAI'I STATE DEPARTMENT OF HEALTH

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- Undetermined
- Laboratory testing either not performed or incomplete.

Case classification[e]

- Probable: Meets the clinical criteria for severe respiratory illness of unknown etiology and epidemiologic criteria; laboratory criteria confirmed, negative, or undetermined.
- Suspect: meets the clinical criteria for moderate respiratory illness of unknown etiology and epidemiologic criteria; laboratory criteria confirmed, negative, or undetermined.

Exclusion Criteria

A case may be excluded as a suspect or probable SARS case if:

- An alternative diagnosis can fully explain the illness.
- The case was reported on the basis of contact with an index case that was subsequently excluded as a case of SARS (e.g., another etiology fully explains the illness) provided other epidemiologic exposure criteria are not present.

Editor's Note: The difference between probable and suspect cases is now based on severity of illness: mild or moderate in suspect cases; severe in probable cases.

[a] A measured documented temperature of >100.4°F is preferred. However clinical judgment should be used when evaluating patients for whom a measured temperature has not been documented.

[b] At present there are no areas with current documented or suspected community transmission of SARS.

[c] Close contact is defined as having cared for or lived with a person known to have SARS or having a high likelihood of direct contact with respiratory secretions and/or body fluids of a patient known to have SARS.

[d] Assays for the laboratory diagnosis of SARS infection include enzyme-linked immunosorbent assay, indirect fluorescent-antibody assay, and reverse transcription polymerase chain reaction (RT-PCR) assays of appropriately collected clinical specimens. Absence of SARS antibody from serum obtained <21 days after illness onset, a negative PCR test, or a negative viral culture does not exclude coronavirus infection and is not considered a definitive laboratory result. In these instances, a convalescent serum specimen obtained>21 days after illness onset is needed to determine infection with SARS. All SARS diagnostic assays are under evaluation.

[e] Asymptomatic SARS infection or clinical manifestations other than respiratory illness might be identified as more is learned about SARS infection.

[f] The last date for illness onset is 10 days (one incubation period) after removal of a CDC travel alert. The case patient's travel should have occurred on or before the last date the travel alert was in place.

Diagnosis

Initial diagnostic testing for persons with suspected SARS should include chest radiograph, pulse oximetry, blood cultures, sputum Gram stain and culture, and testing for viral respiratory pathogens, particularly influenza A & B and respiratory syncytial virus. Clinicians should save any available clinical specimens for additional testing until diagnosis is confirmed. Instructions for specimen collection are available from the CDC at http://www.cdc.gov/ncidod/sars/pdf/specimencollection-sars.pdf. Specimens should be forwarded to CDC by state health departments after consultation with the SARS State Support Team at the CDC Emergency Operations Center. Polymerase chain reaction (PCR), enzyme immunoassay and indirect fluorescent antibody tests to detect coronavirus have been developed and are in use in nine countries, although each test has its limitations.

The development of diagnostic tests for SARS has progressed more slowly than initially hoped. During the initial phase of illness, virus shedding is comparatively low. Virus shedding peaks in respiratory specimens and stools at around 10 days after onset of clinical illness. This unusual behavior creates the need for tests having a particularly high sensitivity. Such tests do not yet exist. Because small quantities of the virus are initially shed, available tests are unable to reliably detect SARS virus or its genetic material during the earliest days of illness. The low sensitivity of current virus detection tests is a particular challenge for SARS control, as patients are capable of infecting others during the initial phase and therefore need to be reliably detected and quickly isolated. In SARS patients, detectable immune responses do not begin until day five or six. Reliable antibody tests can detect virus only by around day 10 following the onset of symptoms.

The Lancet article described RT-PCR results of nasopharyngeal (NPA) aspirates in 14 patients with ARDS and 10 without ARDS. The aspirates consistently demonstrated a peak viral load at day 10 of illness and a decrease to admission levels at day 15. Table 2 describes identification and days after onset of viral detection in various body discharges.

Table 2. Analysis of clinical specimens with Nasopharyngeal aspirates: RT-PCR and antibody seroconversion to SARS
N=20

Specimen	% Positive: 10 days after onset	% Positive: 13 days after onset	% Positive: 16 days after onset	% Positive: 19 days after onset	% Positive: 21 days after onset
NPA	95	90	90	75	47
Stool	100	100	95	80	67
Urine	50	45	35	30	21

Clinicians evaluating suspected cases should use standard precautions (e.g., hand hygiene) together with airborne and contact precautions (http://www.cdc.gov/

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ncidod/sars/infectioncontrol.htm). Until the mode of transmission has been defined more precisely, eye protection should also be worn for all patient contact. Guidelines for physicians to evaluate possible SARS cases were sent by the Hawai`i Department of Health (DOH) on April 11, 2003.

Interim Travel Advisories and Alerts

Travel advisories recommend against nonessential travel to the areas because of increased risk of infection for travelers. Because of the recent reduction in new cases, as of June 25, 2003, the CDC has no travel advisories in effect worldwide. However travel alerts are still in effect for mainland China and Taiwan. A travel alert does not advise against travel, but informs travelers of a health concern and provides advice about specific precautions.

Unanswered Questions

Key unanswered questions include

- Is SARS a seasonal disease and might reappear next October/November in the Northern Hemisphere (or possibly appear in the Southern Hemisphere shortly)?
- Is the SARS associated coronavirus a zoonotic disease and therefore, might reoccur in humans again, jumping from the, as yet not confirmed, animal host/reservoir?
- What was the "true" infection rate? Were there a large number of asymptomatic or mild illness cases?

Heightened surveillance will be necessary to identify possible new introductions of SARS coronavirus.

Disease Reporting & Surveillance

Clinicians who suspect cases of SARS are requested to report cases to the DOH at the following:

O`ahu:	586-4586
O`ahu after hours	566-5049
Maui, Moloka`i, Lana`i	984-8213
Maui after-hours	360-2575
Kaua`i	360-2575
Hawai`i, East	933-0912
Hawai`i, West	322-4877
Big Island after-hours	360-2575

For current information, please see the CDC website at: http://www.cdc.gov/ncidod/sars/ and the WHO website at: http://www.who.int/csr/sars/en/.

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Dr. Paul Effler: Chief of New Division

Dr. Paul Effler is the first Chief of the newly created Disease Outbreak and Control Division. In his new position he continues to be the State Epidemiologist and the Executive Director of the State Bioterrorism Preparedness and Response Program.

Dr. Effler became the Chief of the Epidemiology Branch, State of Hawai`i Department of Health (DOH) in 1994 and was appointed State Epidemiologist in 1997. During his tenure with the DOH he has been appointed Chief of the Communicable Disease Division two different times. His current responsibilities will include communicable disease surveillance and outbreak control, oversight of the state's immunization program and bioterrorism preparedness.

Dr. Effler attended the University of California, San Diego, School of Medicine and is board certified in Preventive Medicine. He obtained his Masters in Public Health degree from the University of Hawai`i. He served in the Epidemic Intelligence Service at the Centers for Disease Control and Prevention from 1991-1993. He has worked as a consultant internationally in the Pacific and Africa.

The Communicable Disease Division continues to be responsible for the prevention, treatment and control of tuberculosis, Hansen's Disease, sexually transmitted diseases, and HIV/AIDS.

Submitted by Mona R. Bomgaars, M.D., M.P.H., Acting Chief, Communicable Disease Division.

West Nile Virus in North America - 2002: Is Hawai`i Ready?

Editor's Note: Residents discovering certain species of freshly dead birds, are encouraged to submit them for West Nile testing. More information can be obtained from the Department of Health website at www.state.hi.us/doh/wnv/. Reporting forms for dead bird submission and instructions on handling the birds are available on this web page, as are photographs of the various species being sought.

WNV Update

In 1999 West Nile Virus (WNV) was detected for the first time in North America during an outbreak in Queens, New York. Since then the disease has surpassed all predictions of its spread and severity, racing across the continent and reaching the Pacific coast by the fall of 2002. Virus activity has been detected in 44 of the lower 48 states and the District of Columbia, up from 27 States in 2001. WNV was also detected in five Provinces of Canada and south into the Caribbean region and Central America. As of December 2002 there were 3389 reported human cases of WNV illness resulting in 241 deaths; this is a dramatic increase from a total of 149 human cases from 1999 through 2001. Despite early estimates that WNV activity would quickly die-out once established, there were human cases reported from New York City in 2002 for the fourth consecutive year.

The toll on animal health may overshadow reports of human illness. Nearly 200 species of birds, mammals, and reptiles became ill as a result of WNV infection. In 2002 there were 14,717 equine cases nation-wide in addition to a number of cases from 13 other non-human mammal species, including domestic cats and dogs. A total of 14,122 WNV-infected dead/dying birds were reported, among them 7719 crows, 4948 blue jays, and 1455 birds representing 92 other species. In approximately 100 U.S. zoos many exotic animals were killed as a result of WNV infection, including cockatiels, seals and emus. Dates of onset for all veterinary cases ranged from January through November 2002.

Throughout the 28 states in 2002 that submitted mosquito specimens, WNV was detected in 4943 pools representing 26 species; WNV has been detected in 36 mosquito species since 1999. *Culex* mosquitoes predominated and accounted for 55% (2717) of all pools.

Hawai`i and Alaska are still free of any WNV activity, although both states reported single imported human cases exposed in other states. WNV will undoubtedly continue its progression through North America in 2003 and is poised to enter the Pacific region.

WNV Transmission Cycle

The West Nile Virus transmission cycle, like most other arthropod-borne viral encephalitides, involves an enzootic amplification of virus within wild birds facilitated by ornithophilic mosquito species (primarily *Culex* spp.). During the amplification process, increasing numbers of birds and mosquitoes become infected thus increasing the chance of epizootic/epidemic transmission. Epizootic transmission involves multiple-host mosquitoes (*Culex, Aedes, Ochlerotatus* spp.) distributing the virus from the infected bird population into other vertebrate groups, which are primarily dead-end hosts (Figure 1). It takes approximately two weeks before an infected mosquito becomes infectious, after which they will remain so for the remainder of their lives. The incubation period for WNV in birds is relatively short, about one day.

The rapid spread of WNV across the continent raises a number of questions and concerns about its epizootiology. The pattern of spread suggests that WNV is being disseminated via migrating birds. While it is generally accepted among health authorities that the period of infective viremia in most species of wild birds is relatively short (1-4 days), this fact would largely negate the migration hypothesis. However, studies conducted in the Old World have documented relatively long-term infective viremias; virus has also persisted in the organs of some birds (ducks and pigeons) as long as three months. This long-term persistence has also been observed in other arboviruses, such as Eastern Equine Encephalitis (EEE) virus, where birds develop infective viremias concomitant with seasonal nesting stresses. This could explain why WNV, similar to EEE increases in intensity during the late summer months, when birds are under the greatest nesting stress.

WNV is exceptional among the arboviral encephalitides for its wide range of hosts and vectors. Most classes of vertebrates

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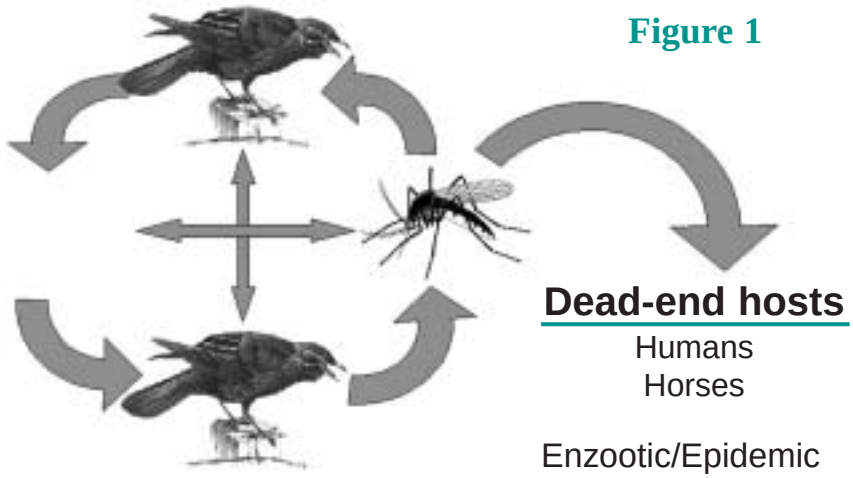
Figure 1



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are susceptible to infection to WNV including birds, mammals, reptiles and amphibians. However, high-titer viremia required for transmission is rare except for birds, where it is common. WNV has been detected in at least 138 species of birds in North America since 1999. In addition, there are many competent mosquito vectors that are capable of transmitting WNV, in both enzootic and epizootic cycles. WNV has been detected in 36 North American mosquito species; four of these species are established in Hawai`i. Although being infected with WNV does not necessarily mean that a vector can transmit the virus, most of these mosquito species have proved capable of transmitting virus to laboratory animals. Exceptional host range and numerous potential vectors may allow WNV to adapt almost any habitat where there are birds and mosquitoes.

There are a number of additional factors, which favor the long-term establishment of WNV in North America. There is a growing body of evidence that WNV can be transmitted directly from bird to bird via their droppings or through their ovaries into the eggs. Additionally, some raptors species have acquired WNV, while feeding on infected prey. It may even be possible for mosquitoes to maintain the WNV without birds by vertically transmitting the virus transovarially to their eggs, which can remain inactive in the environment indefinitely.

Humans and horses are dead-end hosts and WNV produces a viremia that usually disappears with the onset of clinical symptoms. Despite low viremia in horses, 45% of WNV cases result in mortality whereas WNV in humans is largely subclinical. Serosurveys conducted in New York City following the 1999 WNV epidemic revealed that there were as many as 120 to 160 inapparent human infections for every clinical infection.

WNV in Hawai`i

WNV has not been detected endemically in Hawai`i; however, there is reason for concern from human and animal health standpoints. Hawai`i has all of the major components necessary for WNV enzootic activity. Disease transmission (amplification) is a very complex interaction between many biological and physical factors. It is impossible to predict whether WNV virus could establish itself in Hawai`i. Given the rapid spread and establishment of the disease in the continental U.S. thus far, it seems quite likely that it would become established here under the right circumstances.

There are five blood-feeding mosquito species in Hawai`i, three *Aedes* spp, one *Culex* spp and one spp of *Wyeomyia*. Four of these mosquito species have tested positive for WNV in collections on the mainland U.S. in 2002 (Table 1). Bird-feeding *Culex* spp. mosquitoes are the principle enzootic (amplifying) vectors of WNV. In WNV positive mosquito pools on the mainland U.S., the three most common species are *Cx. pipiens, Cx. quinquefasciatus* and *Cx. restuans*, in order of prevalence. The *Culex* mosquito in Hawai`i, *Culex quinquefasciatus* has also been implicated as a competent vector of WNV in laboratory studies. However, equally competent in laboratory studies, the Hawaiian *Aedes* species *(A. albopictus, A. aegypti, A. vexans nocturnus)* have also tested positive for WNV in mainland collections.

The impact of WNV on Hawai`i's natural resources could be more significant than human disease. There are many bird species in Hawai`i that are not present on the mainland (Table 2). The effect of the WNV on them is unknown. However, if the introduction of other bird pathogens such as avian poxvirus and avian malaria are any indication, the disease could devastate already depleted populations of endemic Hawaiian birds.

Surveillance and Control

First indicators of WNV activity within 2289 U.S. counties in 2002 were, in order of prevalence, WNV-infected dead birds (62%), equines (29%), human (4%), mosquito pools (3%), sentinel (0.8%) and wild-caught birds (0.2%). In a majority of counties (86%), human WNV cases were preceded by WNV activity being discovered in the above sampled or sentinel animal populations.

Avian morbidity and mortality is a characteristic unique to WNV enzootics and an omen of impending epizootic activity. Dead bird surveillance for WNV has been successful elsewhere due to the susceptibility of large corvids (crows and jays) and raptors. These large birds are rare in Hawai`i, thus other smaller susceptible species would have to be used. These species could go largely unnoticed due to their small size.

The existing embargo on the importation of birds into Hawai`i closes the door on the largest potential source of the introduction of WNV into Hawai`i. Other possible routes of entry include a number of occasional migrants: golden plovers, Canada geese, ducks, gulls, and various seabirds. Infected mosquitoes could also be transported from the mainland U.S.

The U.S. Army is actively involved in doing mosquito surveillance throughout the various Army installations in the State of Hawai`i. Currently, the Army is collecting mosquito adults in dry ice-baited light traps and their eggs in oviposition traps. Adult mosquitoes are pooled and sent to the virology laboratory at Leahi Hospital, where they are analyzed for the presence of dengue viruses and WNV using RT-PCR technology. Mosquito eggs are reared in the lab and identified and quantified. In the event that a WNV or another arbovirus gets introduced into Hawai`i, targeting surveillance and control efforts using global positioning technology will be possible.

Table 1. Blood-sucking Hawaiian mosquito species associated* with West Nile virus.

Species *	Competence**	Human/bird	Urban/rural
Aedes albopictus	Good	Both	Both
Aedes aegypti	Poor	Human	Urban
Aedes vexans nocturnus	Good	Both	Rural
Culex quinquefasciatus	Good	Both	Both

* West Nile virus isolated, West Nile virus RNA detected, or West Nile virus antigen detected.
** Capable of transmitting WNV to a vertebrate host according to laboratory studies.

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Conclusion

Since the WNV outbreak of 1999, the first such outbreak in an American continent, the spread and severity of the outbreak has exceeded all estimates. Although a relatively minor human disease, there has been considerable impact of the WNV outbreak on domestic and wild vertebrates, which is only just beginning to be appreciated. Many experts feel that the introduction of the virus into Hawai`i is inevitable given the number of potential routes of entry. Yet the long-term establishment of the virus in Hawai`i is questionable. However, if WNV becomes established in Hawai`i, the impact will have major implications for both human and animal health.

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Table 2. Common Hawaiian animals that have been found positive for the presence of West Nile Virus in the form of direct isolation, RNA detection, and/or antigen detection, which occurred on the mainland United States between 1999 to 2002.

Species	Migratory	Competence*
Birds		
Northern Cardinal	No	Unknown
House Finch	No	Unknown
Mallard Duck	Yes	Unknown
Black-Crowned Night-Heron	No	Unknown
Osprey	Yes	Unknown
Barn Owl	No	Unknown
Short-Eared Owl	No	Unknown
Canada Goose	Yes	Poor
Herring Gull	Yes	Poor
Laughing Gull	Yes	Unknown
Ring-Billed Gull	Yes	Unknown
Domestic/Wild Turkey	No	Poor
Ruddy Turnstone	Yes	Unknown
Rock Dove	No	Poor
Ring-Necked Pheasant	No	Unknown
House Sparrow	No	Excellent
European Starling	No	Unknown
Domestic Chicken	No	Poor
Cockatiel	No	Unknown
Cockatoo	No	Unknown
Domestic Goose	No	Unknown
Macaw	No	Unknown
Parakeet	No	Unknown
Peacock	No	Unknown
Mammals		
Domestic Cat	No	Good
Domestic Dog	No	Poor
Donkey	No	Unknown
Domestic Horse	No	Poor
Domestic Rabbit	No	Unknown
Domestic Sheep	No	Unknown

*Capable of maintaining a viremic titer high enough to transmit WNV to a mosquito.

Note: Some of the information was derived from the ProMED-mail Newsgroup updates and other unpublished sources.

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The views expressed in this document are those of the author and do not reflect official policy or position of the Department of the Army, Department of Defense or the U.S. Government.

H7N7: A New Strain of Influenza

Background

Influenza A viruses are found in various animals, including ducks, chickens, pigs, whales, horses, and seals. Influenza A viruses are divided into subtypes based on two proteins on the surface of the virus: hemagglutinin (H) and neuraminidase (N). There are 15 different hemagglutinin subtypes and nine different neuraminidase subtypes, all of which have been found among influenza A viruses in wild birds. Infection with certain avian influenza A viruses (for example, some strains of H5 and H7 viruses) can cause widespread disease and death among some species of wild and especially domestic birds such as chickens and turkeys.

Although it is unusual for humans to become infected directly from animals, sporadic human cases of avian influenza A viruses have occurred. In 1997 and 2003, human infections with avian influenza A (H5N1) virus were reported by the Hong Kong Department of Health. Six deaths were attributed to H5N1 in 1997 and one death in 2003. In 1999, influenza A (H9N2) viruses were isolated from two children in Hong Kong who were hospitalized but fully recovered. These were the first human infections with influenza A (H9N2) viruses to be independently confirmed. It is not known how the two children became infected with H9N2 and no cases have been reported since 1999.

Human Cases of H7N7 Influenza in the Netherlands

As of April 25, 2003, the National Influenza Center in the Netherlands reported that 83 confirmed cases of human H7N7 influenza virus infections had occurred among poultry workers and their families since the H7N7 outbreak began in chickens at the end of February 2003. The vast majority (79) of these people had conjunctivitis, and six of those with conjunctivitis also reported influenza-like illness (ILI) symptoms (e.g., fever, cough, muscle aches). One person had ILI only (no conjunctivitis) and two persons had mild illness that could not be classified as ILI or conjunctivitis. In addition, one individual, a 57-year-old veterinarian who visited one of the affected farms in early April, died on April 17, 2003 of acute respiratory distress syndrome (ARDS) and related complications from H7N7 infection. Dutch authorities have reported evidence of possible transmission of H7N7 influenza from two poultry workers to three family members. All three family members had conjunctivitis and one also had ILI. Additional information can be found on the Centers for Disease Control and Prevention (CDC) website at http://www.cdc.gov/ncidod/diseases/flu/H7N7facs.htm

Influenza in the United States and Hawai`i

In general, influenza activity in the United States (U.S.) is low. During the 2002-03 season the circulating influenza A strains have been identified as H1N1, H1N2, and H3N2. The influenza vaccine should provide some protection for all three circulating influenza A strains. The current vaccine does not protect against the H7N7 influenza virus. The CDC recommends that residents traveling outside the U.S. consult with their physician regarding influenza vaccination and the use of antiviral medications.

The Hawai`i Department of Health (DOH) has identified H1N1 (A/New Caledonia) and H3N2 (A/Panama) as the dominant influenza strains circulating in the state during the 2002-03 season. Again, these are well matched with the vaccine. Hawai`i's geographic proximity to the Pacific/Asian hemisphere where novel strains are expected to emerge has re-emphasized the importance of influenza surveillance in the state. Currently, hemaglutinin surface protein structures are identified on all influenza A culture-confirmed positive cases in the state. Increased state laboratory surveillance of influenza surface proteins helps distinguish in advance whether an influenza strain is unusual and should be sent to CDC for early detection of novel avian influenza strains, such as the H5N1, H9N2, or H7N7, should they occur in Hawai`i.

Due to the detection of human cases of avian influenza A, H5N1 viruses in Hong Kong and more recently, H7N7 in the Netherlands, the DOH is heightening efforts to monitor any severe respiratory illness, especially in visitors from Hong Kong/Asia or the Netherlands, or Hawai`i residents who recently returned from travel to these areas.

The DOH recommends that healthcare providers call the DOH if any of the following is noticed in their patients:

- **Unusual or severe respiratory illnesses**
- **Influenza-like symptoms in patients who are residents or recent travelers from Hong Kong/Asia or Netherlands**
- **Influenza-like symptoms in patients with family/household contacts with recent travel to Hong Kong/Asia or Netherlands**

Disease Investigation Branch (O`ahu):
(808) 586-4586
Maui District Health Office:
(808) 984-8213
Toll Free: 984-2400
Kaua`i District Health Office:
(808) 241-3563
Toll Free: 274-3141
Hawai`i District Health Office:
(808) 933-0912
Toll Free: 974-4000
After hours (State Hospital Operator):
(808) 247-2191
Toll Free 1-800-479-8092

Submitted by Tracy L. Ayers, M.S., Influenza Surveillance Coordinator, Disease Investigations Branch, Disease Outbreak and Control Division.

Influenza Sentinel Surveillance Program

Sentinel physicians and university health centers are recruited annually from across the state to report "influenza-like illness"(ILI) to the Centers for Disease Control and prevention (CDC) each week and collect representative samples for virus strain identification. The collected data offers important "real-time" information to the Hawai`i Department of Health (DOH) and provides early detection of new influenza strains with pandemic potential. This will be the fifth year of the state's participation in this important national program.

Hawai`i Sentinel physicians participating in this surveillance program, which will run from September 29, 2003 to May 17, 2004, will report the following information weekly to CDC:

- The total number of patient visits for ILI each week.
- The number of patient visits for ILI each week by the following four age groups:
  - 0 – 4 year-olds (preschool)
  - 5 – 24 year-olds (school age through college)
  - 25 – 64 year-olds (adults)
  - 65+ year-olds (older adults)

Summary reports are also posted on the web at: http://www.state.hi.us/doh/resource/comm_dis/flu/index.htm

Last year, 25 physician providers participated in the program, reporting ILI activity for the state. Some of the outstanding sentinel physicians for 2002-03 influenza season were Richard Ando, Marconi Dioso, Kathleen Durante, Jennifer Frank, Richard Goodale, Michael Inada, Lily Ning, Robert Kagawa, Jeffrey Lim, James Nakamura and Pediatric Associates Inc. These physicians reported routinely which enabled public health personnel to monitor the spread of influenza in the state effectively.

The DOH would like to encourage more physicians to participate in the Influenza Sentinel Surveillance program in order to enhance detection of new strains with pandemic potential. Hawai`i's distinctive geographic location and travel industry increases our susceptibility to novel influenza strains and unique influenza activity. Hawai`i's influenza season is year-round and often includes influenza B strains unlike some of its mainland counterparts.

Physicians of any specialty (e.g. – family physicians, internists, pediatricians) in any type of practice (e.g. – private practice, public health clinic, urgent care center, emergency room, student health center) are eligible to be influenza sentinel physicians or sites. The data sentinel physicians provide are critical for monitoring the impact of influenza. When combined with influenza surveillance data, the information provided can be used to guide prevention and control activities, vaccine strain selection, and patient care. Sentinel physicians also receive feedback on the data submitted, summaries of regional and national influenza data. Additionally sentinel physicians receive a free subscription to either CDC's Morbidity and Mortality Weekly or Emerging Infectious Diseases journal. The most important consideration in becoming a sentinel physician is that you provide critical public health information that affects your community.

To become a sentinel physician for the upcoming 2003-04 influenza season, please fill out and fax the form below to (808) 586-4595. Or for additional information contact the DOH Influenza Surveillance Program (808) 586-4586.

The next (July-August) issue of the Communicable Disease Report will contain a summary of the influenza surveillance data collected in the 2002-2003 influenza season.

Submitted by Tracy L. Ayers, M.S., Influenza Surveillance Coordinator, Disease Investigations Branch, Disease Outbreak and Control Division.

Sentinel Physician Enrollment Form
Please fax to the Department of Health (808) 586-4595

Last Name: _____ __M.D. __D.O. __PHN __RN

First Name: _____

Practice Name: _____

Street Address: _____ Zip Code: _____ State: *HI*

Phone: _____ Fax: _____

E-Mail address: _____

Specialty: (check one)
__ Family Practice
__ Internal Medicine
__ Pediatrics
__ Emergency Medicine
__

You will also receive **FREE** journal subscriptions to MMWR (Morbidity and Mortality Weekly Report) and Emerging Infectious Diseases!

A Review of Sexually-Transmitted Diseases in Hawai`i – 2002

Over the past twenty years the state of Hawai`i has documented declining rates of sexually transmitted diseases (STDs). However, more recently rates have been increasing. In 1998 there was a 45% increase in chlamydia cases; in 2000 a four per cent increase in gonorrhea cases and a 40% increase in early syphilis cases in 2000. These increasing rates have continued through 2002.

Chlamydia

In 2002, 4530 chlamydia cases were reported for an overall case rate of 363.9 per 100,000 population (See Figure1). This represents a 12% increase as compared with reported cases in 2001, and is the fifth consecutive year of increasing numbers of chlamydia cases. In 2001 the average national rate was 278 cases per 100,000. Hawai`i ranks tenth among the 50 states!

Persons, 24 years old and under, account for two-thirds of the cases. By race, 67% of the cases are Asian/Pacific Islanders, 20% Caucasians, 8% Afro-Americans and 5% Hispanics. By county, O`ahu accounted for 84% of the cases; Hawai`i 7%; Maui 7% and Kaua`i reported 2% of the cases.

Chlamydia became a reportable disease in Hawai`i in 1990. However, it still remains under reported due to the high costs of testing. 76% of the reported cases in 2002 were in women. This disproportionate number of chlamydia cases in women may partially be due to men with symptoms being diagnosed as non-gonococcal urethritis and not being tested for chlamydia.

Reporting sources have remained fairly consistent during the recent years with the private sector reporting 66% of the cases, the military 26%, and the Department of Health (DOH) STD clinic 8%.

Gonorrhea

During 2002, the DOH reported 745 cases of gonorrhea for a case rate of 59.8 cases per 100,000 population (Figure 2). This 23% increase in gonorrhea cases over the previous year continued the increase observed in 2001. In 2001 there was a 24% increase as compared to 2000 (See Table 1).

Table 1
Increase in the Number of Cases of Gonorrhea in 2002 vs. 2001
By Age Group and Sex

	2001			2002				
Age	Male	Female	Total	Male	Female	Total	Diff.	% change
0-14	0	7	7	4	6	10	3	43%
15-19	26	61	87	18	82	100	13	15%
20-24	99	102	201	103	142	245	44	22%
25-29	56	70	126	62	71	133	7	6%
30-34	45	32	77	50	41	91	14	18%
35-39	29	8	37	43	33	76	39	105%
40-44	23	4	27	28	11	39	12	44%
45-49	15	4	19	18	7	25	6	32%
50+	20	5	25	22	4	26	1	4%
Total	313	293	606	348	397	745	139	23%

Table 1 demonstrates the increase by gender and age groups for the year 2002. A large proportion of the increase occurred in the 35 to 49 year age group. There was a 57% increase in this group. The 15-29 age group comprise 64% of the total gonorrhea cases and increased by 15% in 2002. The number of males increased by 11% while the number of females increased by 35%.

Of the 433 gonorrhea cases reported with a race code: 56% were Asian/Pacific Islanders, 24% Caucasians, 15% Afro-Americans and 5% Hispanics. This was unchanged from 2001. The military reported 23% of the gonorrhea cases in 2002, which was a decrease from 28% in 2001. The private sector reported 56% in 2002 compared to 52% in 2001 and the STD clinic reported 21% of the cases both years. Ninety-two percent of the cases were reported from O`ahu.

Ciprofloxacin-resistant gonorrhea is now endemic in Hawai`i. Hawai`i was the first state to identify a ciprofloxacin-resistant gonorrhea in 1993(2). Since then the rate has increased from 2.2% in 1993 to 21.9% in 2001 (Table 2). The percentage of resistant cases decreased to 11% in 2002.

As a result of the recommendations made after a CDC site visit in 1999, the STD Prevention Program instituted increased gonorrhea surveillance activities as well as aggressive case management activities. The state laboratory has implemented routine antibiotic sensitivity testing on all gonorrhea isolates received from all sources. The laboratory receives approximately half of the positive gonorrhea cultures in the state. The laboratory screens for sensitivity to seven antibiotics: azithromycin, ciprofloxacin, ceftriaxone, spectinomycin, cefixime, tetracycline and penicillin. In addition to identifying ciprofloxacin-resistant gonorrhea, the state laboratory has identified three isolates with decreased sensitivity to cefixime and 12 isolates with decreased sensitivity to azithromycin. The threat of emerging resistant strains of gonorrhea continues and with Hawaii's location as a crossroads to the mainland United States, the Pacific and Asia, vigilance is required.

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STDs in Hawai`i 2002

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Syphilis

There were 11 primary and secondary syphilis cases and 21 early latent syphilis cases reported in 2002. This represents a 40% increase in total infectious syphilis cases over 2001 and follows the national trend of increasing early syphilis cases among men who have sex with men (MSM). Due to the high influx of travelers from the West Coast - especially California, Hawai`i's syphilis rates are influenced by the syphilis trends in California. California is currently experiencing a syphilis outbreak within the MSM community (3). The number of early syphilis cases has doubled in California over the past year.

Figure 3 demonstrates the annual syphilis rates since 1980 in Hawai`i. Over the past three years the number of early syphilis cases in Hawai`i has increased from seven cases in 2000 to 19 cases in 2001 to 32 cases in 2002. This increase has occurred primarily in men; increasing from four cases in 2000 to 23 cases in 2002. In 2002 72% of the reported cases were males and 57% of the males shared a male partner. The median age of the MSM was 44 (age range 26-60). 45% of the MSM cases were co-infected with HIV.

Table 2
Total gonococcal isolates cultured per year which were CipR or CipI Resistant, Hawai`i: 1993-2002.

Year	Number of CipI isolates	Number of CipR isolates	Total number of CipI/CipR isolates	Total number of gonococcal isolates
1993	3 (0.9%)	4 (1.3%)	7 (2.2%)	317
1994	7 (1.4%)	3 (0.6%)	10 (2.0%)	490
1995	5 (1.4%)	5 (1.4%)	10 (2.9%)	348
1996	7 (2.2%)	1 (0.3%)	8 (2.5%)	320
1997	10 (3,4%)	4 (1.4%)	14 (4.8%)	290
1998	11 (4.3%)	16 (6.3%)	27 (10.5%)	256
1999	2 (0.9%)	22 (9.5%)	24 (10.4%)	231
2000	3 (1.4%)	25 (12.3%)	28 (13.9%)	202
2001	6 (2.3%)	52 (19.6%)	58 (21.9%)	265
2002	5 (1.4%)	33 (9.5%)	38 (11.0%)	345
Totals	59	165	224	3064

CipI: *Neisseria gonorhoeae* with intermediate resistance to ciprofloxacin, mean inhibitory concentration (MIC) of 0.125-0.5 μg/ml by agar dilution, or disk diffusion zone size of 28-35 mm.
CipR: *Neisseria gonorrhoeae* resistant to ciprofloxacin, MIC ≤1.0 μg/ml by agar dilution or disk diffusion zone size ≤27 mm

Human Immunodeficiency Virus (HIV) Infection

Estimates of HIV prevalence in Hawai`i are based on the national estimates of HIV infection, the number of AIDS cases reported in Hawai`i and blinded seroprevalence studies conducted in Hawai`i. Currently, it is estimated that the state has between 2,300 and 3,000 HIV infected persons.

The HIV antibody counseling and testing program has performed a total of 180,438 HIV antibody tests from 1985 through 2002 with 2,357 positives. In 2002, the HIV antibody counseling and testing program tested 8,550 clients. Of these, 51 were identified as new HIV infections. This represents the second year of an increasing number of HIV positives identified through the counseling and testing program (Figure 4). The number of HIV positives reported in 2001 increased by 24% (34 to 42) over the previous year and again increased by 21% (42 to 51) in 2002. Prior to 2001, the number of HIV positives identified through the HIV antibody counseling and testing program had been steadily decreasing.

A reporting law that requires all health care providers to report HIV infections through an unnamed test code system was signed in August 2001 and implemented in October 2001. HIV statistics based on the results of implementation of this law have not yet been released. However, it is probable that the number of newly identified HIV positives being identified through this new method will follow the increasing trends in STDs and HIV positives being identified through the counseling and testing program.

General Comments

The DOH requests your assistance in the prompt diagnosis, treatment and reporting of syphilis, gonorrhea and chlamydia. We also request the names and locating information of patient's sex partners be obtained for referral and medical management. Disease intervention specialists in the STD/HIV Prevention Program are available to assist with confidentially managed patient and partner counseling and referral. All clients should be counseled regarding the risks of unprotected sexual relations and all persons diagnosed with a STD should be encouraged to undergo testing for HIV infection.

Conversely, all individuals seeking HIV counseling testing should be encouraged to be screened for syphilis, gonorrhea and chlamydia.

Free and confidential STD and HIV testing are available at the STD/HIV Clinic

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STDs in Hawai`i 2002

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Fig. 1: Chlamydia Rates Hawai`i and U.S., 1986-2002

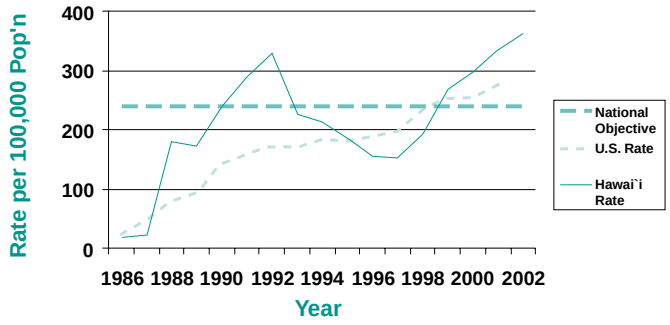


Fig. 2: Gonorrhea Rates Hawai`i and U.S., 1980-2002

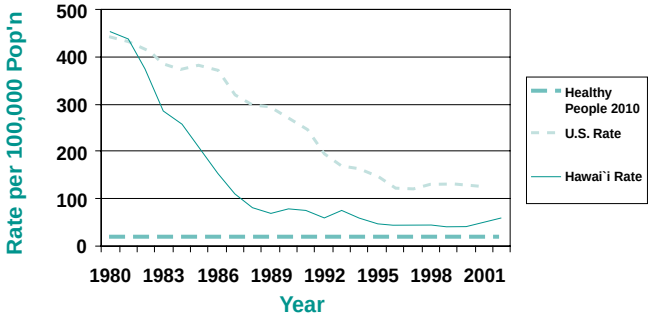


Fig. 3: Primary/Secondary Syphilis Hawai`i and U.S. Rates by Year, 1980-2002

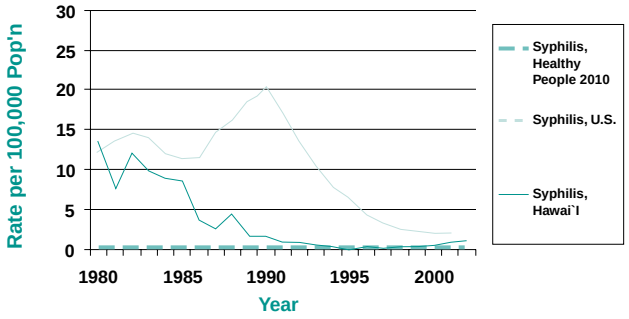
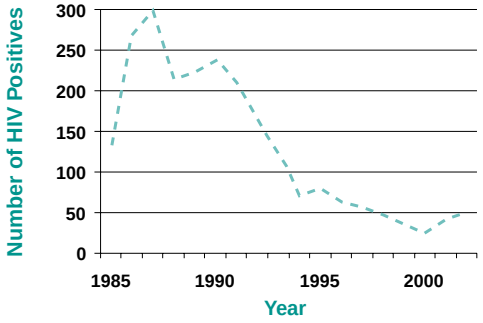


Fig. 4: HIV Positives Detected through the HIV Antibody Counseling and Testing Program, State of Hawaii, 1985-2002



located at the Diamond Head Health Center on O`ahu. Concerned persons on the neighbor islands may call the District Health Offices for a referral to a medical provider.

For more information, please contact Roy Ohye or Venie Lee of the STD Prevention Program Office at (808) 733-9281 in Honolulu.

REFERENCES.

Internet-Based STD Resources:

1. Hawaii Department of Health. http://www.state.hi.us/health/
2. Centers of Disease Control and Prevention CDC 2002 STD Treatment Guidelines. http://www.cdc.gov/std CDC STD Surveillance Reports. http://www.cdc.gov/nchstp/dstd/Stats_Trends/Stats_and_Trends.htm
3. American Social Health Association STD fact sheets and hotlines for patients. http://www.ashastd.org

1. Centers for Disease Control and Prevention, *Sexually Transmitted Disease Surveillance, 2001*, Atlanta, GA; U.S. Department of Health and Human Services, September 2002.

2. Knapp JS, Neal SW, Parekh MC, Ohye R., Higa H, Rice RJ. Emerging in vitro resistance to quinolone in penicillinase-producing *Neisseria gonorrheoeae* stranins in Honolulu, Hawaii. Antimicrob Agents Chemother. 1994:38:2200-2203.

3. Medical Board of California, February 2003.

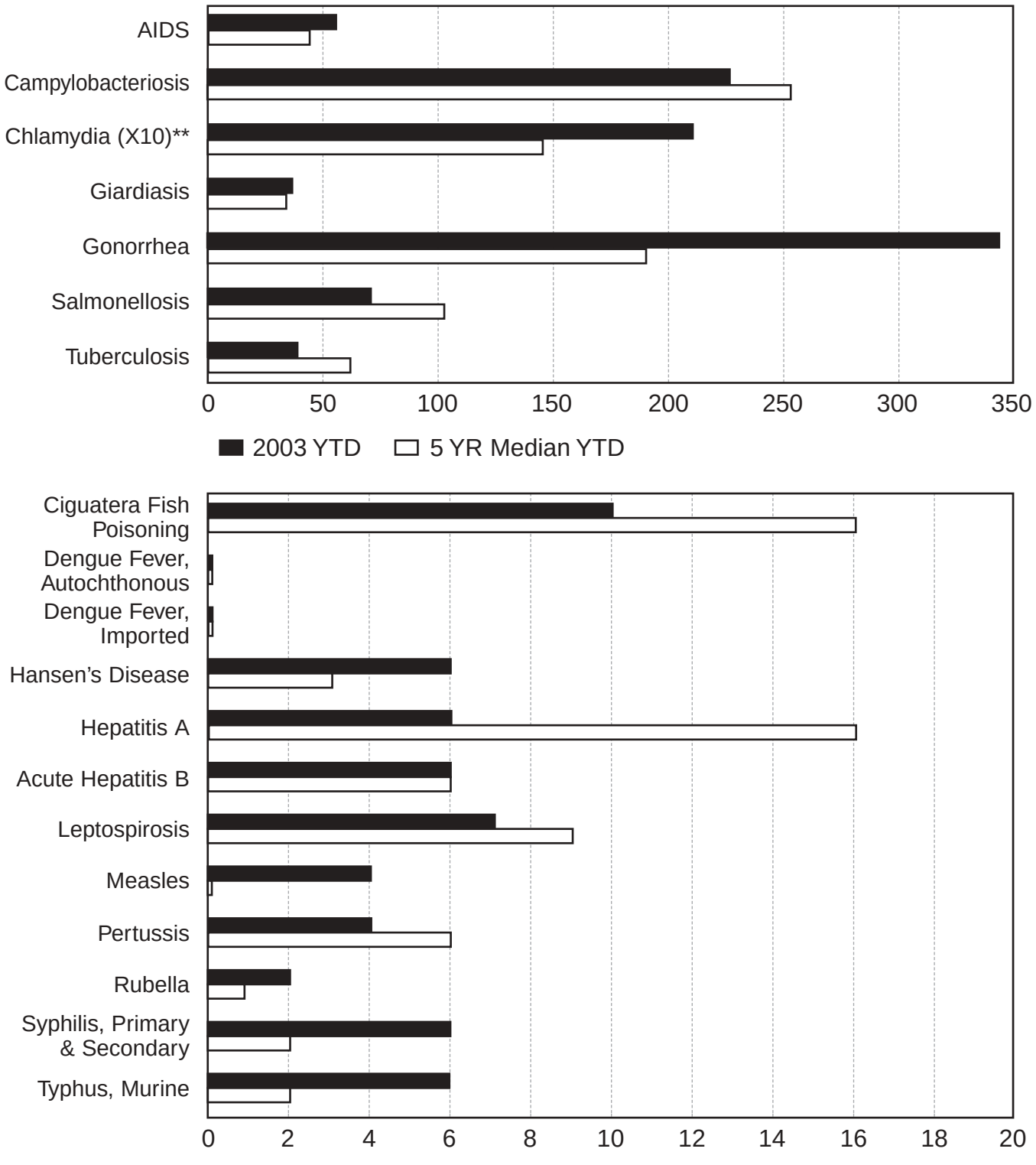
Submitted by Roy G. Ohye, M.S., STD Program Coordinator, STD/AIDS Prevention Branch.

Correction!

In the 2002 Surveillance Summary article in the March-April 2003 issue of the Communicable Disease Report, the state rate for AIDS was incorrect. It was listed at 2.1/100,000. The correct rate is 11.2/100,000. The editor apologizes for this error.

Communicable Disease Surveillance

Selected Diseases by Date of Report*
Hawai'i, 2003 Year-to-date Through May



* These data do not agree with tables using date of onset or date of diagnosis.
** The number of cases graphed represent 10% of the total number reported.

State of Hawai'i
Department of Health
Epidemiology Branch
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Communicable Disease Report

May/June 2003

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